57. (New) The method according to claim 19 wherein the first or second unknown sequence has a length between 3 and 70 nucleotides.

58. (New) The method according to claim 19 wherein the first or second unknown sequence has a length between 4 and 50 nucleotides.

59. (New) The method according to claim 19 wherein the first or second unknown sequence has a length between 5 and 20 nucleotides.

60. (New) The method according to claim 19 wherein the first or second unknown sequence further includes a sequence encoding one or more specific amino acid residues.

61. (New) The method according to claim 28 wherein the one or more specific amino acid residues are conserved amino acid residues of the protein encoded by the target sequence.

62. (New) The method according to claim 19 wherein at least a portion of the multiple cycles of primer extension polymerase amplification is performed such that extension by the polymerase is at least partially performed at a temperature below 70°C for at least 30 sec.

63. (New) The method according to claim 19 wherein at least a portion of the multiple cycles of primer extension polymerase amplification is performed such that extension by the polymerase is at least partially performed at a temperature below 60°C for at least 30 sec.

64. (New) The method according to claim 19 wherein at least a portion of the multiple cycles of primer extension polymerase amplification is performed such that extension by the polymerase is at least partially performed at a temperature below 50°C for at least 30 sec.

65. (New) The method according to claim 19 wherein at least a portion of the one or more cycles of primer extension polymerase amplification is performed such that extension by the polymerase is at least partially performed by heating the amplification reaction mixture from temperature of between 30°C to 50°C to a temperature between 65°C to 75°C over the course of at least 30 sec.--